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FILE COVERS 1907 - 26 Nov 2002 VOL 137 ISS 22

FILE LAST UPDATED: 25 Nov 2002 (20021125/ED)

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*1/CT = controlled Term field*  
*+NT - include narrower terms in controlled term hierarchy*  
*pft - include both preferred and forbidden terms*  
*Ract/RL - reactant or reagent role*  
*Prep/RL - preparation role.*

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L9	395257	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	ALKENES+NT, PFT/CT
L10	112552	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	L9 (L) RACT/RL
L11	163515	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	GLYCOLS+NT, PFT/CT
L12	12992	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	L11 (L) PREP/RL
L13	720	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	L10 AND L12
L14	21839	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	(MANGANESE OR OSMIUM OR RUTHENIUM) (L) CAT/RL
L15	60	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	L13 AND L14
L16	1376	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	HYDROXYLATION CATALYSTS+NT, PFT/CT
L17	28	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	L15 AND L16
L18	685	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	DIHYDROXYLATION+NT, PFT/CT
L19	14	SEA	FILE=HCAPLUS	ABB=ON	PLU=ON	L17 AND L18

=> D IBIB ABS (it) 1-14

L19 ANSWER 1 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2002:819891 HCAPLUS

DOCUMENT NUMBER: 137:278964

TITLE: Stereoselective preparation of optically active vicinal diols via second cycle asymmetric dihydroxylation reaction employing osmium tetroxide and chiral bidentate ligands

INVENTOR(S): Sharpless, K. Barry; Andersson, Malin; Epple, Robert; Fokin, Valery

PATENT ASSIGNEE(S): The Scripps Research Institute, USA

SOURCE: U.S. Pat. Appl. Publ., 11 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

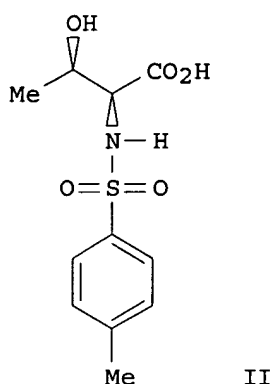
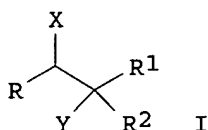
FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002042545	A1	20020411	US 2001-941410	20010828

OTHER SOURCE(S): CASREACT 137:278964

GI



AB A process for catalyzing asym. dihydroxylations of olefins employs an Os(VI) complex as a catalytic intermediate in the formation of chiral vicinal diol products. The process requires a chiral bidentate ligand I [R = H, carboxylate, Ph, 1-naphthyl, 2-naphthyl, alkyl, cycloalkyl, carbamoyl, N-alkylcarbamoyl, and N,N-alkylcarbamoyl, wherein Ph, 1-naphthyl, and 2-naphthyl may have substituents; R1 = carboxylate, carbamoyl, N-alkylcarbamoyl, and N,N-dialkylcarbamoyl; R2 = H, alkyl, aryl and heteroaryl; X and Y independently = OH, amino, N-alkylsulfonylamino, N-arylsulfonylamino, and N-heteroarylsulfonylamino] that favors diol formation in the "second cycle" of asym. dihydroxylation. Optimum results were obtained for the asym. dihydroxylation of Me 4-nitrocinnamic acid employing chiral bidentate ligand II in a t-BuOH/H<sub>2</sub>O solvent system with 0.2 mol% OsO<sub>4</sub> (gtoreq. 98% conversion, 70% ee).

IT Ligands

RL: CAT (Catalyst use); USES (Uses)

(bidentate, chiral; stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

IT Asymmetric synthesis and induction

(stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

IT Alkenes, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(stereoselective prepn. of chiral vicinal diols via second cycle asym.

dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

## IT Dihydroxylation

## Dihydroxylation catalysts

(stereoselective; stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

## IT Glycols, preparation

RL: SPN (Synthetic preparation); PREP (Preparation)

(vicinal, chiral; stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

## IT 7529-22-8, N-Methylmorpholine oxide

RL: RGT (Reagent); RACT (Reactant or reagent)

(claimed co-oxidant; stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

## IT 69-96-5D, N-sulfonyl derivs. 6049-55-4D, N-sulfonyl derivs.

20816-12-0, Osmium tetroxide 34235-88-6 433978-16-6

433978-17-7 433978-18-8 467233-14-3 467233-17-6

RL: CAT (Catalyst use); USES (Uses)

(stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

## IT 100-42-5, Styrene, reactions 637-57-0 1754-62-7 4192-77-2

60512-85-8

RL: RCT (Reactant); RACT (Reactant or reagent)

(stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

## IT 16355-00-3P 25779-13-9P 108741-12-4P 108741-14-6P 122743-18-4P

124649-67-8P 206346-41-0P 299160-76-2P 327969-13-1P 433978-20-2P

RL: SPN (Synthetic preparation); PREP (Preparation)

(stereoselective prepn. of chiral vicinal diols via second cycle asym. dihydroxylation reaction of arylalkenes catalyzed by osmium tetroxide in the presence of chiral aminohydroxycarboxylic acid ligands)

L19 ANSWER 2 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2002:650569 HCAPLUS

DOCUMENT NUMBER: 137:154753

TITLE: Stereoselective dihydroxylation process and catalysts for the preparation of (S)-diols from 3-(aryloxy)-1-propenes

INVENTOR(S): Rao, Alla Venkata Rama; Gurjar, Mukund Keshao; Joshi, Shreerang Vidyadhar

PATENT ASSIGNEE(S): Council of Scientific and Industrial Research, India

SOURCE: Indian, 16 pp.

CODEN: INXXAP

DOCUMENT TYPE: Patent

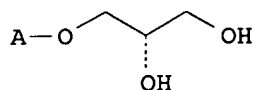
LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
IN 173908	A	19940806	IN 1989-DE899	19891006

OTHER SOURCE(S): MARPAT 137:154753  
GI



- AB (S) diols [I; A = (un)substituted arom. ring] are prepd. by dihydroxylating, 3-(aryloxy)-1-propenes  $\text{AOCH}_2\text{CH}:\text{CH}_2$  with osmium tetroxide, dihydroquinidine-p-chloro-benzoate and N-methylmorpholine-N-oxide in the presence of a mixt. of an org. solvent and water at 0-30.degree..
- IT **Glycols, preparation**  
RL: SPN (Synthetic preparation); **PREP (Preparation)**  
(1,2-, aryloxy, (S)-; stereoselective process for the prepn. of (S)-diols from 3-(aryloxy)-1-propenes)
- IT **Alkenes, reactions**  
RL: RCT (Reactant); **RACT (Reactant or reagent)**  
(3-(aryloxy)-1-propenes; stereoselective process for the prepn. of (S)-diols from from 3-(aryloxy)-1-propenes)
- IT Stereochemistry  
(stereoselective process for the prepn. of (S)-diols from from 3-(aryloxy)-1-propenes)
- IT **Dihydroxylation catalysts**  
(stereoselective; osmium tetroxide and dihydroquinidine-p-chloro-benzoate and N-methylmorpholine-N-oxide in a stereoselective process for the prepn. of (S)-diols from 3-(aryloxy)-1-propenes)
- IT **Dihydroxylation**  
(stereoselective; stereoselective process for the prepn. of (S)-diols from 3-(aryloxy)-1-propenes)
- IT 67-64-1, Acetone, uses 7732-18-5, Water, uses  
RL: NUU (Other use, unclassified); **USES (Uses)**  
(solvent; stereoselective dihydroxylation process and catalysts for the prepn. of (S)-diols from 3-(aryloxy)-1-propenes)
- IT 7529-22-8, N-Methylmorpholine-N-oxide 20816-12-0, **Osmium tetroxide** 113162-02-0, Dihydroquinidine-p-chloro-benzoate  
RL: **CAT (Catalyst use)**; **USES (Uses)**  
(stereoselective dihydroxylation catalysts for the prepn. of (S)-diols from 3-(aryloxy)-1-propenes)

L19 ANSWER 3 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2002:429770 HCAPLUS

DOCUMENT NUMBER: 137:154552

TITLE:  $\text{OsO}_4$  in Ionic Liquid [Bmim]PF<sub>6</sub>: A Recyclable and Reusable Catalyst System for Olefin Dihydroxylation. Remarkable Effect of DMAP

AUTHOR(S): Yao, Qingwei

CORPORATE SOURCE: Department of Chemistry and Biochemistry The Michael Faraday Laboratories, Northern Illinois University, DeKalb, IL, 60115-2862, USA

SOURCE: Organic Letters (2002), 4(13), 2197-2199

CODEN: ORLEF7; ISSN: 1523-7060

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The combination of the ionic liq. [bmim]PF<sub>6</sub> and DMAP provides a most simple and practical approach to the immobilization of  $\text{OsO}_4$  as catalyst

for olefin dihydroxylation. Both the catalyst and the ionic liq. can be repeatedly recycled and reused in the dihydroxylation of a variety of olefins with only a very slight drop in catalyst activity.

IT **Dihydroxylation**

**Dihydroxylation catalysts**

(osmium tetroxide and 4-(dimethylamino)pyridine in ionic liq. for olefin)

IT **Alkenes, reactions**

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(osmium tetroxide and 4-(dimethylamino)pyridine in ionic liq. for olefin dihydroxylation)

IT 1122-58-3, 4-(Dimethylamino)pyridine 7529-22-8, 4-Methylmorpholine 4-oxide 20816-12-0

RL: **CAT (Catalyst use)**; **USES (Uses)**

(osmium tetroxide and 4-(dimethylamino)pyridine in ionic liq. for olefin dihydroxylation)

IT 207276-31-1

RL: **CAT (Catalyst use)**; FMU (Formation, unclassified); FORM (Formation, nonpreparative); **USES (Uses)**

(osmium tetroxide and 4-(dimethylamino)pyridine in ionic liq. for olefin dihydroxylation)

IT 174501-64-5

RL: NUU (Other use, unclassified); **USES (Uses)**

(osmium tetroxide and 4-(dimethylamino)pyridine in ionic liq. for olefin dihydroxylation)

IT **98-83-9, .alpha.-Methylstyrene, reactions 100-42-5, Styrene, reactions 103-30-0, trans-Stilbene 110-83-8, Cyclohexene, reactions 111-66-0, 1-Octene 771-98-2, 1-Phenylcyclohexene 19689-19-1, 5-Decene**

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(osmium tetroxide and 4-(dimethylamino)pyridine in ionic liq. for olefin dihydroxylation)

IT **93-56-1P, Phenylethylene glycol 655-48-1P 1117-86-8P, 1,2-Octanediol 1792-81-0P, cis-1,2-Cyclohexanediol 4217-66-7P 4912-59-8P 58581-16-1P**

RL: SPN (Synthetic preparation); **PREP (Preparation)**

(osmium tetroxide and 4-(dimethylamino)pyridine in ionic liq. for olefin dihydroxylation)

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 4 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2002:294357 HCAPLUS

DOCUMENT NUMBER: 137:32949

TITLE: Catalytic Asymmetric Dihydroxylation of Olefins with Reusable OsO<sub>4</sub>- on Ion-Exchangers: The Scope and Reactivity Using Various Cooxidants

AUTHOR(S): Choudary, Boyapati M.; Chowdari, Naidu S.; Jyothi, Karangula; Kantam, Mannepalli L.

CORPORATE SOURCE: Indian Institute of Chemical Technology, Hyderabad, 500 007, India

SOURCE: Journal of the American Chemical Society (2002), 124(19), 5341-5349

CODEN: JACSAT; ISSN: 0002-7863

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

OTHER SOURCE(S): CASREACT 137:32949

AB Exchanger-OsO<sub>4</sub> catalysts are prepd. by an ion-exchange technique using layered double hydroxides and quaternary ammonium salts covalently bound

to resin and silica as ion-exchangers. The ion-exchangers with different characteristics and opposite ion selectivities are specially chosen to produce the best heterogeneous catalyst that can operate using the various cooxidants in the asym. dihydroxylation reaction. LDH-OsO<sub>4</sub> catalysts composed of different compns. are evaluated for the asym. dihydroxylation of trans-stilbene. Resin-OsO<sub>4</sub> and SiO<sub>2</sub>-OsO<sub>4</sub> designed to overcome the problems assocd. with LDH-OsO<sub>4</sub> indeed show consistent activity and enantioselectivity in asym. dihydroxylation of olefins using K<sub>3</sub>Fe(CN)<sub>6</sub> and mol. oxygen as cooxidants. Compared to the Kobayashi heterogeneous systems, resin-OsO<sub>4</sub> is a very efficient catalyst for the dihydroxylation of a wide variety of arom., aliph., acyclic, cyclic, mono-, di-, and trisubstituted olefins to afford chiral vicinal diols with high yields and enantioselectivities irresp. of the cooxidant used. Resin-OsO<sub>4</sub> is recovered quant. by a simple filtration and reused for a no. of cycles with consistent activity. The high binding ability of the heterogeneous osmium catalyst enables the use of an equimolar ratio of ligand to osmium to give excellent enantioselectivities in asym. dihydroxylation in contrast to the homogeneous osmium system in which excess molar quantities of the expensive chiral ligand to osmium are invariably used. The complexation of the chiral ligand (DHQD)<sub>2</sub>PHAL, having very large dimension, a prerequisite to obtain higher ee, is possible only with the OsO<sub>4</sub><sup>2-</sup> located on the surface of the supports.

IT Silica gel, uses

RL: CAT (Catalyst use); USES (Uses)

(catalytic asym. dihydroxylation of olefins with reusable OsO<sub>4</sub><sup>2-</sup> on ion-exchangers)

IT Alkenes, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(catalytic asym. dihydroxylation of olefins with reusable OsO<sub>4</sub><sup>2-</sup> on ion-exchangers)

IT Dihydroxylation

Dihydroxylation catalysts

(stereoselective; catalytic asym. dihydroxylation of olefins with reusable OsO<sub>4</sub><sup>2-</sup> on ion-exchangers)

IT 7446-70-0D, Aluminum chloride, support for osmium dianion, uses

7786-30-3D, Magnesium chloride, support for osmium dianion

19718-36-6D, supported on SiO<sub>2</sub>, LDH, or resin 140853-10-7

RL: CAT (Catalyst use); USES (Uses)

(catalytic asym. dihydroxylation of olefins with reusable OsO<sub>4</sub><sup>2-</sup> on ion-exchangers)

IT 98-83-9, .alpha.-Methylstyrene, reactions 100-42-5, Styrene,

reactions 103-30-0, trans-Stilbene 110-57-6,

1,4-Dichloro-trans-2-butene 768-49-0, .beta.,.beta.-Dimethylstyrene

771-98-2, 1-Phenyl-1-cyclohexene 872-05-9, 1-Decene

873-66-5, trans-1-Propenylbenzene 1754-62-7, Methyl

(E)-cinnamate 7433-56-9, trans-5-Decene 20009-25-0,

1-Allyloxynaphthalene

RL: RCT (Reactant); RACT (Reactant or reagent)

(catalytic asym. dihydroxylation of olefins with reusable OsO<sub>4</sub><sup>2-</sup> on ion-exchangers)

IT 93-56-1P 1119-86-4P, 1,2-Decanediol 1855-09-0P 2419-73-0P

20907-13-5P 35638-92-7P 36112-95-5P 52305-68-7P 52340-78-0P

54884-84-3P, 5,6-Decanediol 143505-39-9P

RL: SPN (Synthetic preparation); PREP (Preparation)

(catalytic asym. dihydroxylation of olefins with reusable OsO<sub>4</sub><sup>2-</sup> on ion-exchangers)

IT 7529-22-8, N-Methylmorpholine N-oxide 7782-44-7, Oxygen, reactions

13746-66-2

RL: RCT (Reactant); RACT (Reactant or reagent)

(cooxidant in catalytic asym. dihydroxylation of olefins with reusable

OsO42- on ion-exchangers)  
IT 4217-66-7P 16355-00-3P 24347-61-3P 34281-90-8P 40421-51-0P  
124649-67-8P 130932-13-7P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(cooxidant in catalytic asym. dihydroxylation of olefins with reusable  
OsO42- on ion-exchangers)  
REFERENCE COUNT: 70 THERE ARE 70 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 5 OF 14 HCAPLUS COPYRIGHT 2002 ACS  
ACCESSION NUMBER: 2001:527884 HCAPLUS  
DOCUMENT NUMBER: 135:256823  
TITLE: Catalytic Asymmetric Dihydroxylation Using  
Phenoxyethoxymethyl-polystyrene (PEM)-Based Novel  
Microencapsulated Osmium Tetroxide (PEM-MC OsO4)  
AUTHOR(S): Kobayashi, Shu; Ishida, Tasuku; Akiyama, Ryo  
CORPORATE SOURCE: Graduate School of Pharmaceutical Sciences, The  
University of Tokyo, Bunkyo-ku, Tokyo, 113-0033, Japan  
SOURCE: Organic Letters (2001), 3(17), 2649-2652  
CODEN: ORLEF7; ISSN: 1523-7060  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
OTHER SOURCE(S): CASREACT 135:256823

AB Osmium tetroxide microencapsulated in a phenoxyethoxymethyl-polystyrene (PEM)-based resin is prepd. and used as a catalyst in the stereoselective and enantioselective dihydroxylation of alkenes to give nonracemic 1,2-diols. E.g., treatment of chloromethylated polystyrene with sodium 2-phenoxyethanol in THF at 80.degree. gives a polymer which is stirred in cyclohexane and treated with osmium tetroxide followed by coacervation, treatment with methanol, filtration, washing, and drying to give active catalyst. The microencapsulated osmium catalyst is able to dihydroxylate alkenes enantioselectively by using 5 mol% (DHQD)2PHAL or (DHQ)2PHAL as catalysts along with potassium ferricyanide as the stoichiometric oxidant in a 1:1 acetone:water mixt. to give diols in 41-85% yields and in 76-99% ee. E.g., 0.05 equiv. of the microencapsulated osmium tetroxide catalyst, 0.05 equiv. (DHQD)2PHAL, 1.1 equiv. K3Fe(CN)6, and 1.1 equiv. potassium carbonate are stirred in 1:1 acetone:water; styrene is added and the mixt. is stirred for 2 h; after 2 h, 1.1 equiv. of potassium ferricyanide and potassium carbonate are added and the mixt. stirred for an addnl. 2 h to give 1-phenyl-1,2-ethanediol in 85% yield and 78% ee. The catalyst was recovered quant. by simple filtration and reused several times without loss of activity.

IT **Glycols, preparation**  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(1,2-; prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)

IT Asymmetric synthesis and induction  
Supported reagents  
(prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)

IT **Alkenes, reactions**  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)

IT **Hydroxylation catalysts**  
(stereoselective dihydroxylation; prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)

IT **Dihydroxylation**

(stereoselective; prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)

- IT 9003-56-9D, ABS, osmium tetroxide complexes  
RL: PRP (Properties)  
(NMR spectrum of osmium tetroxide bound to acrylonitrile-1,3-butadiene-styrene polymer)
- IT 140853-10-7 140924-50-1, (DHQ)2PHAL  
RL: CAT (Catalyst use); USES (Uses)  
(nonracemic cocatalysts for microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)
- IT 98-83-9, .alpha.-Methylstyrene, reactions 100-42-5, Styrene, reactions 103-30-0, trans-Stilbene 771-98-2, 1-Phenyl-1-cyclohexene 873-66-5, trans-1-Propenylbenzene 4192-77-2, Ethyl trans-cinnamate 7433-56-9, trans-5-Decene  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(nonracemic cocatalysts for microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)
- IT 655-48-1P 1075-05-4P 3139-99-9P, Sodium 2-methoxyethanolate 4217-66-7P 4912-59-8P 16355-00-3P 25779-13-9P 26109-86-4P 56503-12-9P 58581-16-1P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(nonracemic cocatalysts for microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)
- IT 9003-53-6, Polystyrene 9003-54-7 9003-56-9, ABS  
RL: CAT (Catalyst use); USES (Uses)  
(polymers used in the prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)
- IT 9003-53-6DP, Polystyrene, chloromethylated, reaction products with phenoxy- and methoxyethanolate, osmium tetroxide complexes  
RL: CAT (Catalyst use); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
(polymers used in the prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)
- IT 20816-12-0, Osmium tetroxide  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(prepn. of microencapsulated osmium tetroxide catalysts in the enantioselective prepn. of diols by dihydroxylation of alkenes)

REFERENCE COUNT: 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 6 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2001:3410 HCAPLUS

DOCUMENT NUMBER: 134:207367

TITLE: Microencapsulated catalysts: catalytic asymmetric synthesis using a recoverable and reusable polymer-supported catalyst

AUTHOR(S): Yamada, Issaku; Noyori, Ryoji

CORPORATE SOURCE: Nagoya University, Japan

SOURCE: Chemtracts (2000), 13(9), 620-625

CODEN: CHEMFW; ISSN: 1431-9268

PUBLISHER: Springer-Verlag New York Inc.

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

AB The title research of S. Kobayashi is reviewed with commentary and 6 refs.



The review discusses the stereoselective and asym. dihydroxylation reactions of alkenes with microencapsulated osmium tetroxide to give 1,2-diols stereoselectively.

IT **Glycols, preparation**

RL: SPN (Synthetic preparation); **PREP (Preparation)**

(1,2-; review and commentary on the prepn. and use of microencapsulated osmium tetroxide as a reagent for the stereoselective and enantioselective dihydroxylation of alkenes to diols)

IT **Asymmetric synthesis and induction**

**Stereoselective synthesis**

**Supported reagents**

(review and commentary on the prepn. and use of microencapsulated osmium tetroxide as a reagent for the stereoselective and enantioselective dihydroxylation of alkenes to diols)

IT **Alkenes, reactions**

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(review and commentary on the prepn. and use of microencapsulated osmium tetroxide as a reagent for the stereoselective and enantioselective dihydroxylation of alkenes to diols)

IT **Hydroxylation catalysts**

(stereoselective dihydroxylation; review and commentary on the prepn. and use of microencapsulated osmium tetroxide as a reagent for the stereoselective and enantioselective dihydroxylation of alkenes to diols)

IT **Dihydroxylation**

(stereoselective; review and commentary on the prepn. and use of microencapsulated osmium tetroxide as a reagent for the stereoselective and enantioselective dihydroxylation of alkenes to diols)

IT 20816-12-0DP, **Osmium** tetroxide, polymer-bound

RL: **CAT (Catalyst use)**; RCT (Reactant); SPN (Synthetic

preparation); **PREP (Preparation)**; **RACT (Reactant or reagent)**; **USES (Uses)**

(review and commentary on the prepn. and use of microencapsulated osmium tetroxide as a reagent for the stereoselective and enantioselective dihydroxylation of alkenes to diols)

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 7 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2000:756436 HCAPLUS

DOCUMENT NUMBER: 133:323285

TITLE: Dihydroxylation of olefins by means of transition metal catalysts

INVENTOR(S): Beller, Matthias; Doeblner, Christian; Mehltrittter, Gerald

PATENT ASSIGNEE(S): Bayer Ag, Germany

SOURCE: Ger. Offen., 6 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 19920038	A1	20001026	DE 1999-19920038	19990425
WO 2000064848	A1	20001102	WO 2000-EP3493	20000418
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE,				

SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA,  
ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE,  
DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF,  
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

EP 1175382 A1 20020130 EP 2000-926978 20000418

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
IE, SI, LT, LV, FI, RO

PRIORITY APPLN. INFO.:

DE 1999-19920038 A 19990425

WO 2000-EP3493 W 20000418

OTHER SOURCE(S): MARPAT 133:323285

AB Olefins are dihydroxylated to 1,2-diols using mol. oxygen in the presence of osmium, ruthenium, and/or manganese compds. in water or in aq. solvent at pH 7.5-13. For selectivity of the dihydroxylation reaction the catalyst is activated by an amine. The procedure is simple and highly selective and economically and ecol. favorable. In an example, styrene was converted to 1-phenyl-1,2-ethanediol in 63% yield using K<sub>2</sub>OsO<sub>4</sub>·2H<sub>2</sub>O catalyst at 50.degree..

IT **Hydroxylation catalysts**

(stereoselective dihydroxylation; for dihydroxylation of olefins to diols)

IT **Dihydroxylation**

(stereoselective; of olefins to diols)

IT 993-02-2, **Manganese** triacetate 1313-13-9, **Manganese** dioxide, uses 7439-96-5D, **Manganese**, compds., uses 7440-04-2D, **Osmium**, compds., uses 7440-18-8D, **Ruthenium**, compds., uses 7722-64-7, Potassium permanganate 10049-08-8, **Ruthenium** trichloride 10118-76-0, Calcium permanganate 12036-10-1, **Ruthenium** dioxide 13444-93-4, **Osmium** trichloride 14690-66-5, **Manganese** trichloride 15696-40-9, Triosmium dodecacarbonyl 20427-56-9, **Ruthenium** tetroxide 20816-12-0, **Osmium** tetroxide 27057-71-2 50381-48-1, Trioxo(tert-butylimido)osmium 55318-08-6 77347-87-6 83781-30-0

RL: **CAT (Catalyst use)**; **USES (Uses)**

(catalysts for dihydroxylation of olefins to diols)

IT 98-83-9, .alpha.-Methylstyrene, reactions 100-42-5, Styrene, reactions 110-83-8, Cyclohexene, reactions 827-54-3 873-66-5, trans-.beta.-Methylstyrene

RL: **RCT (Reactant)**; **RACT (Reactant or reagent)**

(dihydroxylation using transition metal catalysts)

IT 1792-81-0P, cis-1,2-Cyclohexanediol

RL: **IMF (Industrial manufacture)**; **PREP (Preparation)**

(from dihydroxylation of cyclohexene using transition metal catalysts)

IT 1855-09-0P, 1-Phenyl-1,2-propanediol 4217-66-7P

RL: **IMF (Industrial manufacture)**; **PREP (Preparation)**

(from dihydroxylation of methylstyrene using transition metal catalysts)

IT 93-56-1P, 1-Phenyl-1,2-ethanediol

RL: **IMF (Industrial manufacture)**; **PREP (Preparation)**

(from dihydroxylation of styrene using transition metal catalysts)

IT 13603-65-1P

RL: **IMF (Industrial manufacture)**; **PREP (Preparation)**

(from dihydroxylation of vinyl naphthalene using transition metal catalysts)

IT 280-57-9, 1,4-Diazabicyclo[2.2.2]octane 1337-81-1, Vinylpyridine

RL: **CAT (Catalyst use)**; **USES (Uses)**

(in catalysts for dihydroxylation of olefins to diols)

L19 ANSWER 8 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2000:707583 HCAPLUS  
 DOCUMENT NUMBER: 134:28985  
 TITLE: Osmium-catalyzed dihydroxylation of olefins using dioxygen or air as the terminal oxidant  
 AUTHOR(S): Doeblner, Christian; Mehltretter, Gerald M.; Sundermeier, Uta; Beller, Matthias  
 CORPORATE SOURCE: Institut fuer Organische Katalyseforschung (IfOK), Universitaet Rostock e.V., Rostock, D-18055, Germany  
 SOURCE: Journal of the American Chemical Society (2000), 122(42), 10289-10297  
 CODEN: JACSAT; ISSN: 0002-7863  
 PUBLISHER: American Chemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 OTHER SOURCE(S): CASREACT 134:28985

AB The osmium-catalyzed dihydroxylation of various olefins, e.g., PhCMe:CH<sub>2</sub>, using mol. oxygen or air as the stoichiometric oxidant is reported. Arom. olefins yield the corresponding diols in good to excellent chemoselectivities under optimized pH conditions (pH = 10.4-12.0). Air can be used under moderate pressures (3-9 bar) instead of dioxygen as the reoxidant. By increasing the oxygen content of the soln., it is possible to achieve highly efficient conversion at low catalyst amt. (catalyst/substrate = 1:4000). Tri- and tetrasubstituted olefins, e.g., 1-methylcyclohexene, are oxidized at pH > 11 to give the corresponding 1,2-diols in good to very good yields without requiring the addn. of sulfonamides or other hydrolysis agents. Studies of the dihydroxylation of functionalized olefins, e.g., 2-vinyl-1,3-dioxolane, demonstrate that the reaction conditions tolerate a variety of functional groups. In the presence of dihydroquinine or dihydroquinidine derivs. (Sharpless ligands), asym. dihydroxylation occurs with lower enantioselectivities than those of the classical K<sub>3</sub>[Fe(CN)<sub>6</sub>] reoxidn. system.

IT Asymmetric synthesis and induction  
 Stereoselective synthesis  
 (osmium-catalyzed stereoselective and asym. dihydroxylation of olefins using dioxygen)

IT **Alkenes, reactions**  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (osmium-catalyzed stereoselective and asym. dihydroxylation of olefins using dioxygen)

IT **Hydroxylation catalysts**  
 (stereoselective dihydroxylation; osmium-catalyzed stereoselective and asym. dihydroxylation of olefins using dioxygen)

IT **Dihydroxylation**  
 (stereoselective; osmium-catalyzed stereoselective and asym. dihydroxylation of olefins using dioxygen)

IT 140853-10-7 149725-81-5, (DHQD)2PYR 176298-44-5, (DHQD)2AQN  
 RL: CAT (Catalyst use); USES (Uses)  
 (ligands in the osmium-catalyzed asym. dihydroxylation of olefins using dioxygen)

IT 280-57-9, DABCO  
 RL: CAT (Catalyst use); USES (Uses)  
 (ligands in the osmium-catalyzed stereoselective dihydroxylation of olefins using dioxygen)

IT 98-83-9, .alpha.-Methylstyrene, reactions 100-42-5, Styrene, reactions 103-30-0, trans-Stilbene 563-79-1, 2,3-Dimethyl-2-butene 591-49-1 625-27-4, 2-Methyl-2-pentene 637-69-4, 4-Methoxystyrene 762-72-1, Allyltrimethylsilane 771-98-2, 1-Phenyl-1-cyclohexene 827-54-3, 2-Vinylnaphthalene 1073-67-2, 4-Chlorostyrene 1746-13-0, Allyl phenyl ether 3984-22-3 5296-64-0, Allyl phenyl sulfide

7433-56-9, trans-5-Decene 25291-17-2

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(osmium-catalyzed stereoselective and asym. dihydroxylation of olefins using dioxygen)

IT **76-09-5P 93-56-1P**, 1-Phenyl-1,2-ethanediol 538-43-2P  
 655-48-1P 4217-66-7P 4912-59-8P 5149-48-4P 7477-64-7P,  
 1-(4-Chlorophenyl)-1,2-ethanediol 7795-80-4P 13603-63-9P,  
 1-(4-Methoxyphenyl)-1,2-ethanediol 13603-65-1P, 1-(2-Naphthyl)-1,2-  
 ethanediol 16355-00-3P 32345-64-5P 35638-92-7P 49801-14-1P  
 52340-78-0P 52718-65-7P 55118-66-6P 58581-16-1P 97798-48-6P  
 105616-53-3P 108392-44-5P 114988-48-6P 119235-89-1P 125132-75-4P  
 130932-13-7P 139165-57-4P 152142-03-5P 311810-70-5P 311810-71-6P  
 311810-72-7P

RL: SPN (Synthetic preparation); **PREP (Preparation)**

(osmium-catalyzed stereoselective and asym. dihydroxylation of olefins using dioxygen)

REFERENCE COUNT: 63 THERE ARE 63 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 9 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1999:757493 HCAPLUS

DOCUMENT NUMBER: 132:107523

TITLE: Catalytic Asymmetric Dihydroxylation of Olefins Using  
 a Recoverable and Reusable Polymer-Supported Osmium  
 Catalyst

AUTHOR(S): Kobayashi, Shu; Endo, Masahiro; Nagayama, Satoshi

CORPORATE SOURCE: Graduate School of Pharmaceutical Sciences, The  
 University of Tokyo, Hongo Bunkyo-ku Tokyo, 113-0033,  
 Japan

SOURCE: Journal of the American Chemical Society (1999),  
 121(48), 11229-11230

CODEN: JACSAT; ISSN: 0002-7863

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

OTHER SOURCE(S): CASREACT 132:107523

AB OsO<sub>4</sub> supported on an acrylonitrile-butadiene-polystyrene (ABS) polymer  
 catalyzed the dihydroxylation of alkenes. After filtration, the ABS-MC  
 OsO<sub>4</sub> was recovered and could be used in 2nd, 3rd, and 4th runs with no  
 loss of activity. Asym. dihydroxylation was run in the presence of  
 (DHQD)2PHAL.

IT **Alkenes, reactions**

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(asym. dihydroxylation of olefins using polymer-supported osmium  
 catalyst)

IT **Hydroxylation catalysts**

(stereoselective dihydroxylation; asym. dihydroxylation of olefins  
 using polymer-supported osmium catalyst)

IT **Dihydroxylation**

(stereoselective; asym. dihydroxylation of olefins using  
 polymer-supported osmium catalyst)

IT 20816-12-0D, Osmium tetroxide, polymer-supported

RL: CAT (Catalyst use); USES (Uses)

(asym. dihydroxylation of olefins using polymer-supported  
 osmium catalyst)

IT **98-83-9**, 2-Phenyl-1-propene, reactions 100-42-5, Styrene,

reactions 111-66-0, 1-Octene 300-57-2,

3-Phenyl-1-propene 768-49-0 769-57-3 771-98-2,

1-Phenylcyclohexene 873-66-5, (E)-1-Phenyl-1-propene

1192-37-6, Methylenecyclohexane 7433-56-9, (E)-5-Decene 15870-10-7,

2-Methyl-1-heptene

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(asym. dihydroxylation of olefins using polymer-supported osmium catalyst)

IT 93-56-1P 1075-05-4P 1117-86-8P, 1,2-Octanediol 1199-97-9P  
1671-73-4P 1855-09-0P 4217-66-7P 20907-13-5P 52305-68-7P  
54884-84-3P, 5,6-Decanediol 59411-58-4P 99799-80-1P

RL: SPN (Synthetic preparation); **PREP (Preparation)**

(asym. dihydroxylation of olefins using polymer-supported osmium catalyst)

REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 10 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1998:775219 HCAPLUS

DOCUMENT NUMBER: 130:109779

TITLE: Asymmetric dihydroxylation of olefins by osmium tetroxide coordinated with chiral Cinchona alkaloid

AUTHOR(S): Hajamis, Umed D.; Gadre, Jayawant N.; Pednekar, Suhas  
CORPORATE SOURCE: Organic Chemistry Research Laboratory, Ramnarain Ruia College, Mumbai, 400 019, India

SOURCE: Indian Journal of Chemistry, Section B: Organic Chemistry Including Medicinal Chemistry (1998), 37B(9), 925-928

CODEN: IJSBDB; ISSN: 0376-4699

PUBLISHER: National Institute of Science Communication, CSIR

DOCUMENT TYPE: Journal

LANGUAGE: English

OTHER SOURCE(S): CASREACT 130:109779

AB Bisesters of cinchonine, cinchonidine, dihydrocinchonine and dihydrocinchonidine with terephthalic acid and isophthalic acid are used as chiral auxiliaries for osmium tetroxide-catalyzed asym. dihydroxylation of olefins such as styrene, .alpha.-methylstyrene, Me cinnamate, Et cinnamate, iso-Pr cinnamate, cinnamyl alc., cyclohexene, 1-methylcyclohexene, 1-phenylcyclohexene, cycloheptene, cyclooctene, 3-chloro-1-propene, 1-hexene and Me fumarate, and the enantiomeric excess in every case has been detd.

IT Chiral auxiliary  
(asym. dihydroxylation of olefins by osmium tetroxide coordinated with chiral Cinchona alkaloid)

IT **Hydroxylation catalysts**  
**Hydroxylation catalysts**

(stereoselective dihydroxylation; asym. dihydroxylation of olefins by osmium tetroxide coordinated with chiral Cinchona alkaloid)

IT **Dihydroxylation**  
(stereoselective; asym. dihydroxylation of olefins by osmium tetroxide coordinated with chiral Cinchona alkaloid)

IT 219660-56-7P 219660-57-8P 219660-58-9P 219660-59-0P 219660-60-3P  
219660-61-4P 219660-62-5P 219660-63-6P

RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); **PREP (Preparation)**; **USES (Uses)**

(asym. dihydroxylation of olefins by **osmium** tetroxide coordinated with chiral Cinchona alkaloid)

IT 98-83-9, reactions 100-42-5, reactions 107-05-1,  
3-Chloro-1-propene 110-83-8, Cyclohexene, reactions  
591-49-1, 1-Methylcyclohexene 592-41-6, 1-Hexene,  
reactions 624-49-7, Dimethyl fumarate 628-92-2, Cycloheptene  
771-98-2, 1-Phenylcyclohexene 931-88-4, Cyclooctene  
1754-62-7, (E)-Methyl cinnamate 4192-77-2, (E)-Ethyl cinnamate  
4407-36-7, (E)-Cinnamyl alcohol 60512-85-8, (E)-Isopropyl cinnamate

RL: RCT (Reactant); **RACT (Reactant or reagent)**  
 (asym. dihydroxylation of olefins by osmium tetroxide coordinated with  
 chiral Cinchona alkaloid)

IT **93-56-1P**, 1-Phenyl-1,2-ethanediol **96-24-2P**,  
 3-Chloro-1,2-propanediol 608-69-5P 1792-81-0P, cis-1,2-Cyclohexanediol  
 4217-66-7P, 2-Phenyl-1,2-propanediol 4277-32-1P, 1,2-Cyclooctanediol  
 4912-59-8P, cis-1-Phenyl-1,2-cyclohexanediol 6920-22-5P, 1,2-Hexanediol  
 52718-65-7P, cis-1-Methyl-1,2-cyclohexanediol 56503-12-9P 65678-03-7P,  
 1,2-Cycloheptanediol 65870-46-4P 65914-68-3P 219660-64-7P

RL: SPN (Synthetic preparation); **PREP (Preparation)**  
 (asym. dihydroxylation of olefins by osmium tetroxide coordinated with  
 chiral Cinchona alkaloid)

REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 11 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1998:377310 HCAPLUS

DOCUMENT NUMBER: 129:167213

TITLE: Generation and synthetic use of reactive transition  
 metal complexes in electrolysis systems

AUTHOR(S): Torii, Sigeru

CORPORATE SOURCE: Department of Applied Chemistry, Faculty of  
 Engineering, Okayama University, Okayama, 700, Japan

SOURCE: Studia Universitatis Babes-Bolyai, Chemia (1996),  
 41(2), 1-5

CODEN: SUBCAB; ISSN: 1224-7154

PUBLISHER: Studia Universitatis Babes-Bolyai

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Recycling Os and Mn complexes in electrooxidative media and their  
 application in synthesis of l-shikonin. Electrochem. oxidn. of Os  
 catalyzed asym. dihydroxylation of olefins with Sharpless ligand is  
 discussed. Chiral Os-complex assisted electrosynthesis of chiral diols  
 and asym. electroepoxidn. of olefins with Mn complexes and synthesis of  
 l-shikonin involving electrochem. asym. dihydroxylation are described.

IT **Glycols, properties**

RL: PRP (Properties); SPN (Synthetic preparation); **PREP**  
**(Preparation)**

(chiral; electrosynthesis of)

IT **Alkenes, properties**

RL: PRP (Properties); RCT (Reactant); **RACT (Reactant or reagent)**

(electrochem. asym. dihydroxylation and electrochem. asym. epoxidn. in  
 presence of transition metal complexes)

IT Organic synthesis

Organic synthesis

(electrochem.; of chiral diols and shikonin)

IT Transition metal complexes

RL: CAT (Catalyst use); PRP (Properties); **USES (Uses)**

(generation and synthetic use of reactive transition metal complexes in  
 electrolysis systems: electrochem. asym. dihydroxylation and  
 electrochem. asym. epoxidn. in presence of transition metal complexes)

IT Oxidation, electrochemical

(in shikonin synthesis)

IT Recycling

(of osmium and manganese complexes in electrooxidative media)

IT **Hydroxylation catalysts**

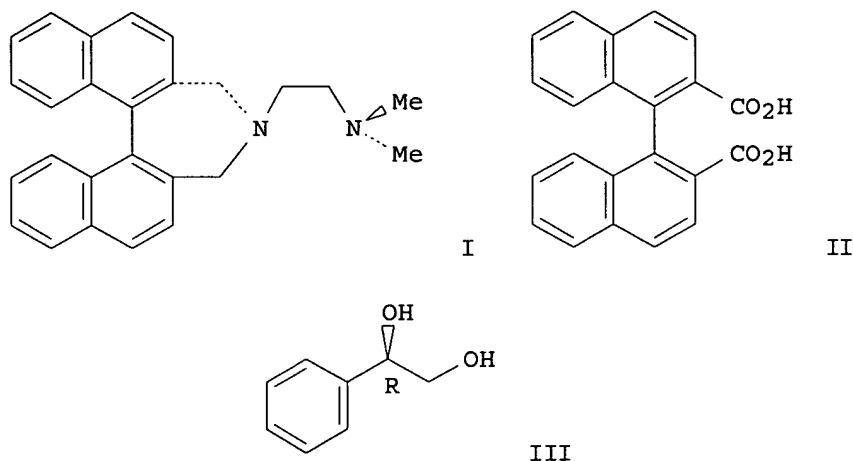
**Hydroxylation catalysts**

(stereoselective dihydroxylation, electrochem.; osmium complexes for  
 olefins)

IT Epoxidation catalysts

- (stereoselective, electrochem.; manganese complexes for olefins)
- IT Epoxidation  
(stereoselective, electrochem.; of olefins in presence of manganese complexes)
- IT Dihydroxylation  
(stereoselective, electrochem.; of olefins in presence of osmium complexes)
- IT 517-89-5P, Shikonin  
RL: PNU (Preparation, unclassified); PREP (Preparation)  
(asym. electrochem. dihydroxylation in prepn. of)
- IT 98-83-9, properties 563-79-1 766-90-5  
RL: PRP (Properties); RCT (Reactant); **RACT (Reactant or reagent)**  
(asym. electrochem. epoxidn. of olefins with Mn complexes)
- IT 7440-04-2D, Osmium, complexes, uses  
RL: **CAT (Catalyst use)**; PRP (Properties); **USES (Uses)**  
(catalyst in electrosynthesis of chiral diol from olefin)
- IT 103-30-0 592-41-6, 1-Hexene, uses 768-49-0 827-54-3 872-05-9, 1-Decene  
RL: NUU (Other use, unclassified); PRP (Properties); **USES (Uses)**  
(chiral Os complex assisted electrosynthesis of chiral diol from olefin)
- IT 16355-00-3P 24347-61-3P 40421-51-0P 43210-74-8P 49801-14-1P  
52340-78-0P 84994-66-1P 87827-60-9P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(chiral Os complex assisted electrosynthesis of chiral diol from olefin)
- IT 100-42-5, properties  
RL: PRP (Properties); RCT (Reactant); **RACT (Reactant or reagent)**  
(chiral Os complex assisted electrosynthesis of chiral diol from styrene)
- IT 211109-99-8  
RL: RCT (Reactant); **RACT (Reactant or reagent)**  
(electrochem. asym. dihydroxylation in shikonin synthesis)
- IT 194360-26-4  
RL: **CAT (Catalyst use)**; PRP (Properties); **USES (Uses)**  
(in asym. electrochem. epoxidn. of olefins)
- IT 75-65-0, tert-Butyl alcohol, uses 584-08-7, Potassium carbonate  
7553-56-2, Iodine, uses 7758-11-4, Dipotassium phosphate 7778-53-2,  
Tripotassium phosphate 10022-66-9, Dipotassium tetrahydroxydioxosmate(2-)  
13746-66-2, Potassium ferricyanide 140853-10-7, 1,4-Bis(dihydroquinidine)phthalazine  
RL: NUU (Other use, unclassified); PRP (Properties); **USES (Uses)**  
(in chiral Os complex assisted electrosynthesis of chiral diol from styrene)
- IT 211110-00-8P  
RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); **RACT (Reactant or reagent)**  
(prepn. and acetylation in shikonin synthesis)
- IT 211110-01-9P  
RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); **RACT (Reactant or reagent)**  
(prepn. and electrooxidn. in shikonin synthesis)
- IT 39540-69-7P, Shikonin triacetate  
RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); **RACT (Reactant or reagent)**  
(prepn. and hydrolysis in shikonin synthesis)
- IT 5076-20-0P 21019-52-3P 130548-11-7P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(prepn. in asym. electrochem. epoxidn. of olefins with Mn complexes)

L19 ANSWER 12 OF 14 HCAPLUS COPYRIGHT 2002 ACS  
 ACCESSION NUMBER: 1996:645521 HCAPLUS  
 DOCUMENT NUMBER: 126:46899  
 TITLE: Enantioselective dihydroxylation of olefins by osmium tetroxide in the the presence of an optically active 1,1'-binaphthyl diamine derivative  
 AUTHOR(S): Rosini, Carlo; Tanturli, Roberto; Pertici, Paolo; Salvadori, Piero  
 CORPORATE SOURCE: Dep. Chim. Chim. Industriale, Univ. Pisa, Pisa, 56126, Italy  
 SOURCE: Tetrahedron: Asymmetry (1996), 7(10), 2971-2982  
 CODEN: TASYE3; ISSN: 0957-4166  
 PUBLISHER: Elsevier  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 OTHER SOURCE(S): CASREACT 126:46899  
 GI



AB The chiral diamine (S)-I, introduced by Cram and Mazaleyrat, has been reprep'd. following a different sequence which involves the resoln. of diacid (RS)-II. The e.e. (via HPLC and NMR), the abs. configuration (via CD) and the most stable conformation (via UV and mol. mech. calcns.) of (S)-I have been detd. and (S)-I has been employed as a chiral auxiliary in the stoichiometric syn-dihydroxylation of olefins (e.g., styrene) obtaining optically active 1,2-diols (e.g., III; yield 83%; e.e. 96%) with e.e.'s up to 98%.

IT **Glycols, preparation**

RL: SPN (Synthetic preparation); **PREP (Preparation)**  
 (1,2-, chiral; enantioselective dihydroxylation of olefins by osmium tetroxide in the the presence of an optically active 1,1'-binaphthyl diamine deriv.)

IT **Aromatic hydrocarbons, reactions**

Aromatic hydrocarbons, reactions  
 RL: RCT (Reactant); **RACT (Reactant or reagent)**  
 (aryl alkenes; enantioselective dihydroxylation of)

IT **Alkenes, reactions**

**Alkenes, reactions**  
 RL: RCT (Reactant); **RACT (Reactant or reagent)**  
 (aryl; enantioselective dihydroxylation of)

IT **Hydroxylation catalysts**



- (osmylation, stereoselective; of alkenes using osmium tetroxide and chiral 1,1'-binaphthyl diamine)
- IT **Dihydroxylation**  
(stereoselective, catalysts, stereoselective; of alkenes using osmium tetroxide and chiral 1,1'-binaphthyl diamine)
- IT **Dihydroxylation**  
(stereoselective; of alkenes)
- IT 20816-12-0, Osmium tetroxide  
RL: CAT (Catalyst use); USES (Uses)  
(enantioselective dihydroxylation of olefins by osmium tetroxide in the presence of an optically active 1,1'-binaphthyl diamine deriv.)
- IT 107656-84-8P  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(enantioselective dihydroxylation of olefins by osmium tetroxide in the presence of an optically active 1,1'-binaphthyl diamine deriv.)
- IT 91-57-6, 2-Methylnaphthalene 95-13-6, Indene 98-83-9, reactions 100-42-5, Styrene, reactions 103-30-0  
300-57-2 447-53-0 771-98-2 873-66-5  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(enantioselective dihydroxylation of olefins by osmium tetroxide in the presence of an optically active 1,1'-binaphthyl diamine deriv.)
- IT 2586-62-1P, 1-Bromo-2-methylnaphthalene 18531-96-9P 20717-79-7P  
37763-43-2P 37803-02-4P 76373-23-4P 76635-70-6P 80703-23-7P  
85464-88-6P 89555-39-5P 99827-46-0P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(enantioselective dihydroxylation of olefins by osmium tetroxide in the presence of an optically active 1,1'-binaphthyl diamine deriv.)
- IT 16355-00-3P 35638-92-7P 40421-51-0P 52340-78-0P 57495-92-8P  
71214-80-7P 79299-22-2P 125132-75-4P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(enantioselective dihydroxylation of olefins by osmium tetroxide in the presence of an optically active 1,1'-binaphthyl diamine deriv.)

L19 ANSWER 13 OF 14 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1993:448775 HCAPLUS

DOCUMENT NUMBER: 119:48775

TITLE: The origin of high enantioselectivity in the dihydroxylation of olefins using osmium tetroxide and cinchona alkaloid catalysts

AUTHOR(S): Corey, E. J.; Noe, Mark C.; Sarshar, Sepehr

CORPORATE SOURCE: Dep. Chem., Harvard Univ., Cambridge, MA, 02138, USA

SOURCE: Journal of the American Chemical Society (1993), 115(9), 3828-9

CODEN: JACSAT; ISSN: 0002-7863

DOCUMENT TYPE: Journal

LANGUAGE: English

OTHER SOURCE(S): CASREACT 119:48775

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\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The cinchona alkaloid deriv. I is an extremely effective catalyst for the enantioselective dihydroxylation of olefins by OsO<sub>4</sub>. Several independent

lines of evidence indicate that the enantioselective pathway with I involves a highly reactive and rigid bridged species (II) rather than a reactant in which pentacoordinate osmium units function relatively independently. The supporting evidence includes: (1) the degree and abs. stereochem. sense of olefin face selectivity; (2) the faster rate for the stoichiometric reaction of II with the first equiv. of olefin relative to the second; (3) the much faster rate of reaction of I as catalyst as compared with equiv. concns. of III; (4) the much lower enantioselectivities with III as catalyst as compared to I; (5) the drop in enantioselectivity of the dihydroxylation with decreasing concn. of III; (6) the fact that the rate of the dihydroxylation of olefins by III is not first order in the complex of OsO<sub>4</sub> with III and in olefin, but is kinetically more complex, since the apparent second-order rate consts. increase with increasing concn. . Since O(3) in the reactive intermediate II is blocked by the pyridazine linker, the olefin is attacked by O(1) and O(2). With this constraint the examn. of either Dreiding type or space-filling models unambiguously reveals the steric interactions which det. the abs. stereochem. of the dihydroxylation reaction.

IT **Alkenes, reactions**

RL: RCT (Reactant); **RACT (Reactant or reagent)**  
(enantioselective dihydroxylation of, mechanism of catalytic)

IT **Stereochemistry**

(in dihydroxylation of olefins using osmium tetroxide and cinchona alkaloid catalysts)

IT **Crystal structure**

Molecular structure

(of osmium tetroxide cinchona alkaloid complex)

IT **Kinetics of hydroxylation**

(osmylation, stereoselective, of olefins, catalytic)

IT **Hydroxylation**

(osmylation, stereoselective, of olefins, mechanism of catalytic)

IT **Hydroxylation catalysts**

(osmylation, stereoselective, osmium tetroxide/cinchona alkaloid complex, for olefins)

IT 19718-36-6

RL: CAT (Catalyst use); USES (Uses)  
(catalysts, contg. cinchona alkaloid, for enantioselective dihydroxylation of olefins)

IT 148215-08-1

RL: **CAT (Catalyst use)**; USES (Uses)  
(catalysts, contg. **osmium** tetroxide, for enantioselective dihydroxylation of olefin)

IT 148215-09-2

RL: **CAT (Catalyst use)**; USES (Uses)  
(catalysts, contg. **osmium** tetroxide, for enantioselective dihydroxylation of olefins)

IT 148215-10-5 148602-62-4

RL: CAT (Catalyst use); USES (Uses)  
(catalysts, for dihydroxylation of olefins)

IT 100-42-5, reactions 103-30-0, trans-Stilbene 395-45-9

771-98-2, 1-Phenylcyclohexene 872-05-9, 1-Decene

13269-52-8, trans-3-Hexene 15870-10-7

RL: RCT (Reactant); **RACT (Reactant or reagent)**  
(enantioselective dihydroxylation of, mechanism of catalytic)

IT 93-56-1P 492-70-6P 922-17-8P, 3,4-Hexanediol 1119-86-4P,

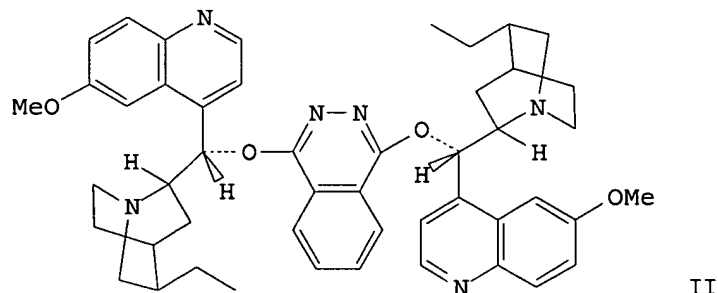
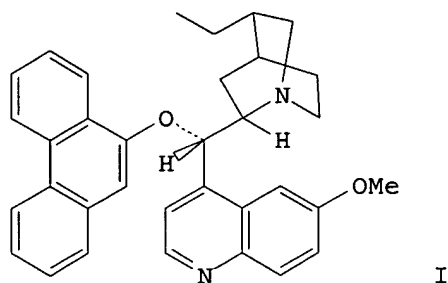
1,2-Decanediol 52305-68-7P 99799-80-1P 148215-11-6P

RL: SPN (Synthetic preparation); **PREP (Preparation)**  
(enantioselective prepn. of)

IT 148602-61-3P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and crystallog. of)

L19 ANSWER 14 OF 14 HCAPLUS COPYRIGHT 2002 ACS  
ACCESSION NUMBER: 1992:591030 HCAPLUS  
DOCUMENT NUMBER: 117:191030  
TITLE: Asymmetric dihydroxylation of enynes  
AUTHOR(S): Jeong, Kyu Sung; Sjo, Peter; Sharpless, K. Barry  
CORPORATE SOURCE: Dep. Chem., Massachusetts Inst. Technol., Cambridge,  
MA, 02139, USA  
SOURCE: Tetrahedron Letters (1992), 33(27), 3833-6  
CODEN: TELEAY; ISSN: 0040-4039  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
OTHER SOURCE(S): CASREACT 117:191030  
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AB Catalytic asym. dihydroxylations of 1,3-enynes were studies using phenanthryldihydroquinidine I and bis(dihydroquinidine)phthalazine II. Terminal olefins showed moderate (38-79% ee) and trans-disubstituted olefins high enantioselectives (73-97% ee). Thus, Os-catalyzed dihydroxylation of PhC.tplbond.CCH:CH<sub>2</sub> in presence of I afforded glycol (R)-PhC.tplbond.C(CHOH)<sub>2</sub>H in 53% ee and 91% yield; the ee was increased to 73% in presence of II.

IT **Alkenynes**

RL: RCT (Reactant); **RACT (Reactant or reagent)**  
(asym. dihydroxylation of, catalyzed by osmium tetroxide and chiral ligands, yne diols by)

IT **Glycols, preparation**

RL: SPN (Synthetic preparation); **PREP (Preparation)**  
(yne, prepn. of, via asym. dihydroxylation of enynes catalyzed by osmium tetroxide and chiral ligands)

- IT **Hydroxylation**  
(osmylation, stereoselective, of enynes catalyzed by osmium tetroxide and chiral ligands, yne diols by)
- IT **Hydroxylation catalysts**  
(osmylation, stereoselective, osmium tetroxide with chiral ligands, for enynes to yne diols)
- IT 18684-88-3 18685-03-5  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(Grignard reaction of, with methylmagnesium chloride)
- IT 113278-45-8  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(Grignard reactions of)
- IT 1463-04-3 6714-96-1 13343-79-8 13633-26-6 33622-26-3,  
1-Decen-3-yne 79159-59-4 80033-73-4 110792-91-1  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(asym. dihydroxylation of, using osmium tetroxide in presence of chiral ligands)
- IT 20816-12-0, Osmium tetroxide  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts from chiral ligands and, for asym. dihydroxylation of enynes to yne diols)
- IT 135042-88-5 140853-10-7  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(chiral ligand, for asym. dihydroxylation of enynes catalyzed by osmium tetroxide)
- IT 31552-03-1P 31552-04-2P 42134-52-1P 107148-34-5P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(prepn. and asym. dihydroxylation of, using osmium tetroxide in presence of chiral ligands)
- IT 143536-18-9P 143536-19-0P 143615-31-0P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of)
- IT 39517-87-8P 54977-47-8P 118620-96-5P 143536-11-2P 143536-12-3P  
143536-13-4P 143536-14-5P 143536-15-6P 143536-16-7P 143536-17-8P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of, via asym. dihydroxylation of enyne in presence of osmium tetroxide and chiral ligands)